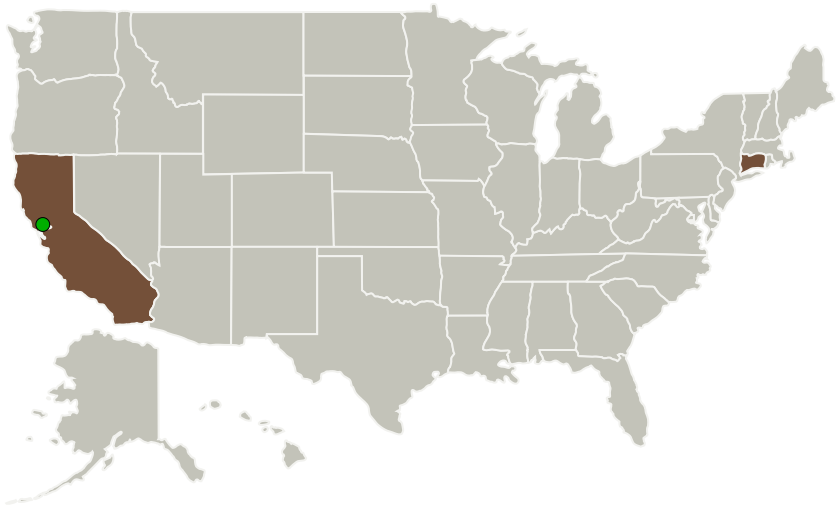
Torrefaction Processing of Human Fecal Waste, Phase I

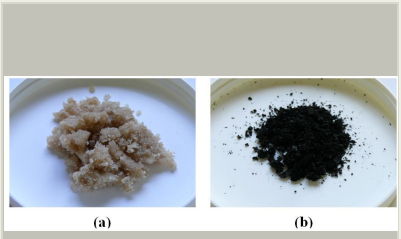
Completed Technology Project (2013 - 2013)

Project Introduction

New technology is needed to collect, stabilize, safen, recover useful materials, and store human fecal waste for long duration missions. The current SBIR Phase I proposal will examine an innovative torrefaction (mild pyrolysis) processing system that can be used to sterilize feces and produce a stable, free flowing powder than can be easily stored or recycled, while simultaneously recovering all of the moisture and producing minimal amounts of other gases. The system will also require minimal crew interactions, low energy demands, and tolerate mixed or contaminated waste streams. The objective of the Phase I study is to demonstrate the feasibility of this improved process using bench scale experiments. This will be accomplished in three tasks: 1) design and construct bench scale processing unit that can accommodate different modes of heating (conventional, microwave, radiant/solar); 2) laboratory and modeling studies on a fecal simulant over a range of process conditions (temperature, holding time, atmosphere); 3) evaluation of laboratory results and preliminary design of Phase II prototype.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Advanced Fuel Research, Inc.	Lead Organization	Industry	East Hartford, Connecticut
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Connecticut

Project Transitions

May 2013: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138705)*

Images

Project Image
Torrefaction Processing of Human Fecal Waste
(https://techport.nasa.gov/image/128340)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Advanced Fuel Research, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

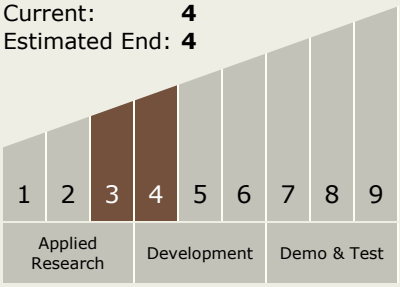
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Michael A Serio

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.3 Waste Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System